

THE

# Soybean Digest



*Official Publication*

OF

THE AMERICAN SOYBEAN ASSOCIATION

VOLUME 1 • NUMBER 9



JULY

1941

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Brokers, chemists and all classes of professional men with an interest in the soybean industry are invited to list their firms in the professional directory of *The Soybean Digest*, official publication of The American Soybean Association.

Rates furnished upon request.

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# THE Soybean Digest

Vol. I

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No. 9

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## MARKET SUMMARY

SOYBEANS			
Chicago Futures	July 18	Week Ago	Month Ago
July .....	\$1.50 3/4	\$1.50	\$1.39 3/4
October .....	1.38 1/4	1.40 3/4	1.30 3/4
December .....	1.39 3/4	1.41 3/4	1.31 3/4
SOYBEAN OIL			
Tanks, midwest mills .. 9 1/4 - 3/4 c (old)	10c (old)	10-10 1/4 c (old)	
9-9 1/4 c (new)	9c (new)		
SOYBEAN OIL MEAL			
Memphis, Tenn., Futures			
July .....	\$28.50 @	\$29.25	\$26.00 @
October .....	28.65 @	28.75	25.20 @
December .....	28.50	28.90	25.20 @

Soybeans hit new highs for the season during the month under review, and remained fairly steady at near the \$1.50 level for the July futures during the last week. From a July futures high of \$1.56 1/2 on June 27, prices went tumbling when Price Administrator Leon Henderson threatened to place a ceiling on cottonseed oil prices far below the current levels. Prices were strengthened during the last week of the period by reports that the federal government was seeking to buy soybeans for export, and by rumors of congressional opposition to legislation to curb advancing prices of farm products. Further threats to put a ceiling on cottonseed oil, however, had a depressing effect which leveled off the advance at about the \$1.50 level on July futures.

June inspections under the Grain Standards Act totaled 2,177 cars, 173 less than May inspections. Two cars of Louisiana soybeans were received at Chicago during the week ending July 19, indicating the strength of the market there.

Soybean oil quotations reached a high of 10 3/4 to 11 cents on June 27, and then dipped sharply in sympathy with cottonseed oil following Henderson's threat of a ceiling on cottonseed oil. Soybean oil meal prices made erratic gains in the last month, apparently because of strength in the soybean market.

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# British To Get Soybeans

Soybeans and soy flour have been placed on the priority list for shipment to Great Britain under the lease-lend act, and shipments probably are already under way, according to word received by G. G. McIlroy, president of the American Soybean Association, in the following letter:

Springwell Lane, Rickmansworth, Herts  
13th June 1941 (England)

President G G McIlroy  
The American Soybean Association  
Irwin Ohio U S A

Dear Mr McIlroy,

I have pleasure in advising that we had news from the Ministry of Food yesterday to the effect that soya beans and soya bean flour had been placed on the Priority List and that shipments of both will take place next month onwards under the Lease and Lend Bill.

I therefore take the opportunity of extending to you and the American Soybean Association our very grateful thanks for the help and assistance you have been to us in achieving this end.

Although the claims that have been made for soya beans and soya flour were recognized by a number of scientists advising the Government, it has been a very protracted business to see what progress was being made during the many months that we have been working at this end, and we are therefore very relieved to have received this communication.

We hope that it will be the beginning of a closer association between our two organizations and you will no doubt receive from our own Association a letter expressing their thanks.

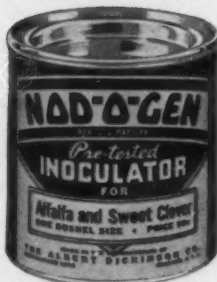
We note what you have written to us under date 25th April and trust that the farming community will continue to extend the soya bean acreage, the products of which will be more than ever needed during the next few years.

Yours faithfully, For and On Behalf of Soya Foods Ltd

J C Ferree, Director

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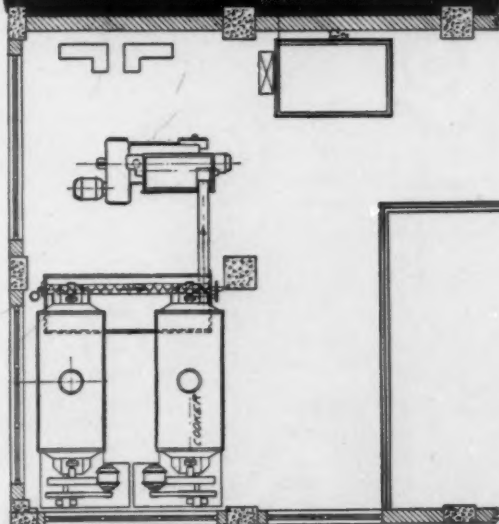
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*always add*

## MORE EXPELLERS

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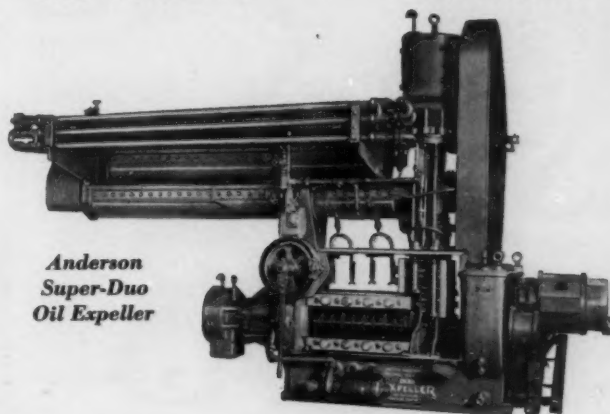
● Everyone knows automobile owners who are so completely satisfied with their cars that they buy the same model year after year. Soybean millers are much the same as these automobile owners. Once they have used Anderson Super-Duo Expellers for pressing soybeans, they become so thoroughly satisfied with the quality of Expeller oil and oil meal, the capacity and low upkeep of the Expeller that when they are in the market for additional equipment, they invariably add new Expellers.

Just as automobiles are improved each year, so Expellers likewise are improved from year to year. Our engineers are continuously at work on ways and means of adding to the Expeller's efficiency. These improvements are also available to owners of older models. For complete information on the Anderson Super-Duo Expeller, send for a copy of the book, "The Anderson Super-Duo Expeller for Pressing Soybeans."

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# Technological Problem

## 2. The Solvent Process

By W. H. GOSS, Chemical Engineer

U. S. Regional Soybean Industrial Products Laboratory\*

IN solvent extraction processes, instead of being granulated, the beans are rolled into thin flakes in order to create a high specific surface without introducing excessive fines which would clog filters and other parts of the system. The flaking operation is, in most cases, preceded by cracking and heating and, occasionally, by addition of moisture. Smooth rolls are employed, one pair high, having diameters of 30 to 36 inches, and the flakes produced range in thickness from 6 to 15 thousandths of an inch, depending upon the type of extractor used.

The Bollman system is shown diagrammatically in Fig. 1. The flakes are introduced into baskets with perforated bottoms which hang between a pair of endless chains comprising two vertical legs, one descending and one ascending. The chain rotates in a clockwise direction

making a complete revolution in about 1 hour. Baskets are filled at the top of the right-hand or downcoming leg, and are dumped when they reach the top of the rising leg.

The extraction is accomplished by means of hexane or similar solvent which is sprayed over the top basket on either side, percolating through lower baskets in succession. Freshly redistilled solvent runs in countercurrent flow down through the ascending chain of baskets; and the resulting solution, known as half-miscella, is collected and pumped to the top of the

\* A cooperative organization participated in by the Bureaus of Agricultural Chemistry and Engineering and Plant Industry of the U. S. Department of Agriculture, and the Agricultural Experiment Stations of the North Central States of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

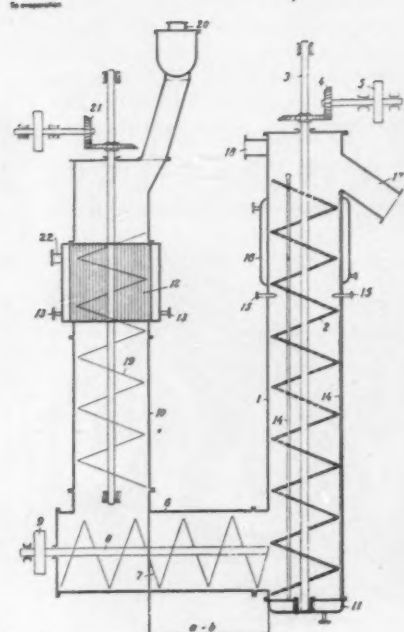
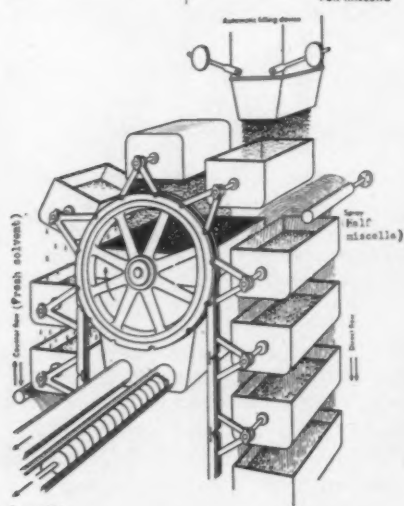
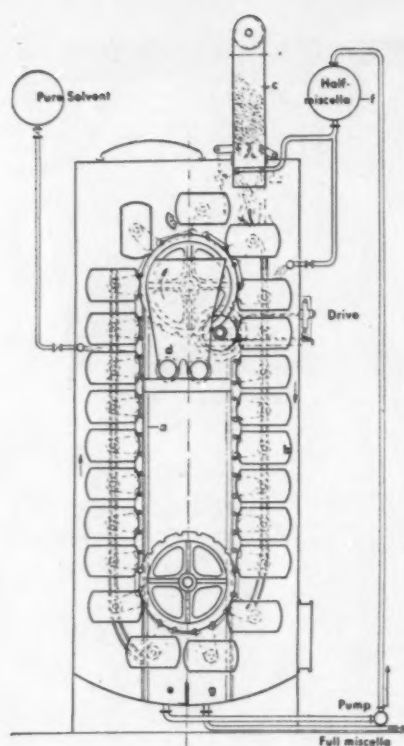
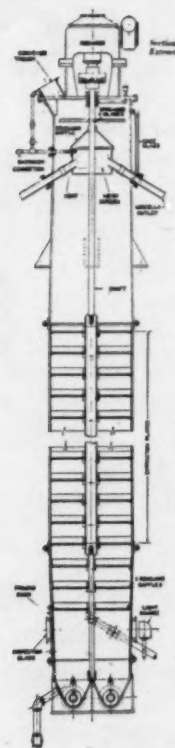
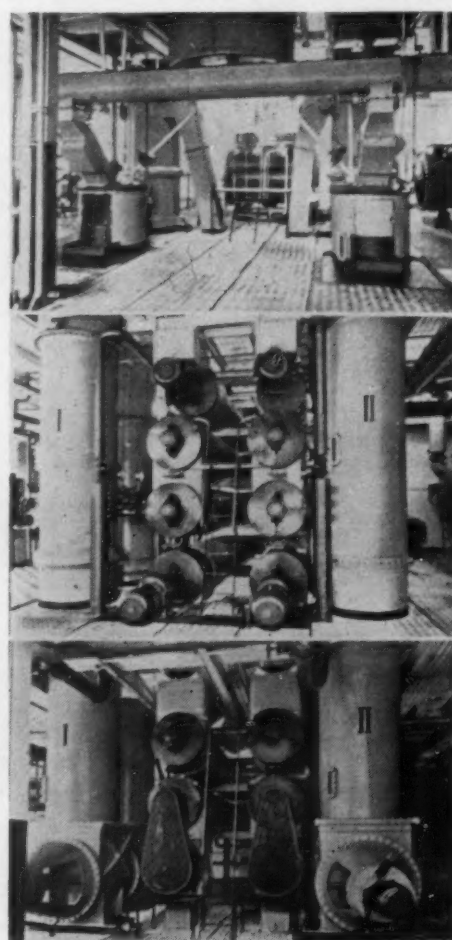


Fig. 1 (upper left column). The Bollman or Hansa-Muhle system of extraction (courtesy of Albert H. Bruecke). Fig. 2 (center left). Charging and discharging mechanism of Bollman extraction system (courtesy of Albert H. Bruecke). Fig. 3 (bottom left). Extractor used in Hildebrandt system (courtesy of Sieck and Drucker, Inc.). Fig. 4 (center column). An installation of two Hildebrandt extraction units (courtesy Sieck and Drucker, Inc.). Fig. 5 (below). The Allis-Chalmers extraction column (courtesy of Allis Chalmers Manufacturing Co.).





# Oil Processing Soybeans

downcoming side so that it washes the descending baskets in parallel flow.

The final solution of 20 to 25 percent oil in solvent which accumulates at the bottom of the descending side is known as full-miscella, and, after it has been filtered, the solvent is evaporated, condensed, and returned to the system. The final operation in the preparation of crude oil is the removal of traces of solvent by means of a stripping column.

The extractor proper is enclosed by a gas-tight steel housing into which fresh flakes are charged and from which extracted meal is discharged by the mechanisms shown in Fig. 2. The extracted solids are fed immediately into steam driers which drive off entrained solvent and discharge finished meal containing well under 1 percent of residual oil.

## Bollman System

The Bollman or Hansa-Muhle system, as just described, has been built in sizes having capacities of 25 to 400 tons per day, and, with the exception of the extractor proper, is typical of most extraction systems. Each process, however, resorts to a distinctly different method for contacting the bean flakes with solvent.

Of special importance in this country is the Hildebrandt system which is shown in Fig. 3. Flaked beans are introduced at "20" through the top of the left leg of a U-shaped double column, and are slowly propelled downward, then horizontally toward the right, and then vertically upward through the right-hand leg by means of perforated revolving screw conveyors. Extracted meal is discharged at "17" from the top of the right-hand leg into the driers. Solvent is introduced into the same leg at "15," somewhat below the

meal exit, and flows through the system countercurrent to the flakes, overflowing through miscella pipes at "13," somewhat below the top of the left worm flight.

In this process, the extraction is effected by complete immersion in liquid solvent as contrasted to the percolation action occurring in the Bollman system. Figure 4 shows an installation of two Hildebrandt units. The batteries of horizontal drums shown between the two extractors are meal driers used to drive off all entrained solvent. These extractors are built in two sizes having capacities of 55 and 110 tons per day and are frequently used in multiple installations consisting of two or more units.

The Ford Motor Company's extraction system is an attempt to develop a continuous extraction apparatus having the advantages of larger mills but built in a unit small enough to operate as a community plant. The extractor consists of an inclined tube partly filled with solvent through which a modified screw conveyor propels soybean flakes upward while solvent passes downward in countercurrent flow.

## Steam-Jacketed Shell

The upper part of the shell is steam jacketed and serves to remove most of the solvent, the remainder of which is driven off in another inclined tube, or steamer, located immediately below the upper portion of the extractor tube. Solvent is distilled from the miscella and subsequently condensed and returned to the system. Figure 6 shows the interior of one of the Ford experimental plants which consists of two extractors, each having a capacity of 6 tons per day.

The Allis-Chalmers system is also used on soybeans and is shown in Fig. 5. The

extractor consists of a vertical cylinder having circular plates between stationary scraper arms, the plates rotating at slow speed about a central shaft. Flakes are introduced at the top and pass downward, dropping through slots in successive plates so staggered that the material travels in a helical path. Solvent is introduced at the bottom and flows upward in a similar spiral course, overflowing through the miscella outlet connection shown near the top of the column.

The extracted flakes settle into the bottom of the column where they are discharged by means of a revolving screw which forces the meal through an adjustable spring-loaded cone valve. This mechanism forms the extracted material into a solid plug, squeezing out most of the solvent and preventing the bulk of the solvent in the column from running out along with the flakes. Extractors of this type have been built with a capacity of 50 to 75 tons per day.

## French Enters Field

The French Oil Mill Machinery Company has recently entered the field of continuous solvent extraction. In general, their equipment resembles that of the German-manufactured Bollman system. The Kennedy extractor and the system developed by the E. I. du Pont de Nemours and Company, Inc., also deserve mention, although neither is yet in commercial operation on soybeans.

With the exception of adhesives, most industrial products derived from soybean protein require the use of solvent-extracted meal, since the higher oil content of pressed cake generally imparts undesirable properties to plastics and like products. Solvent extraction of soybeans to yield a protein conforming to industrial requirements should preferably be carried out under conditions somewhat different from those ordinarily employed when the meal is intended for feeding; otherwise the protein may become denatured by overheating. This is a relatively new problem concerning which there is little available information.

On the other hand, solvent-extracted meal for use in feeds requires a vigorous wet toasting process following the extraction in order to increase its nutrient value and palatability. It is the recent introduction of toasting methods which has largely accounted for the abatement of long-standing prejudice against the use of solvent-processed meal in feeds.

—edd—

## FSCC Enters Soybean Market

The Federal Surplus Commodities Corporation entered the soybean market early this month with a call for bids to supply soybeans to the corporation. July 8 was set as the deadline for offer acceptance, and 151,166 bushels of soybeans were purchased.

The FSCC purchases considerable quantities of agricultural products for export purposes under the lend-lease act, and it is thought likely that the soybeans were desired for foreign markets.

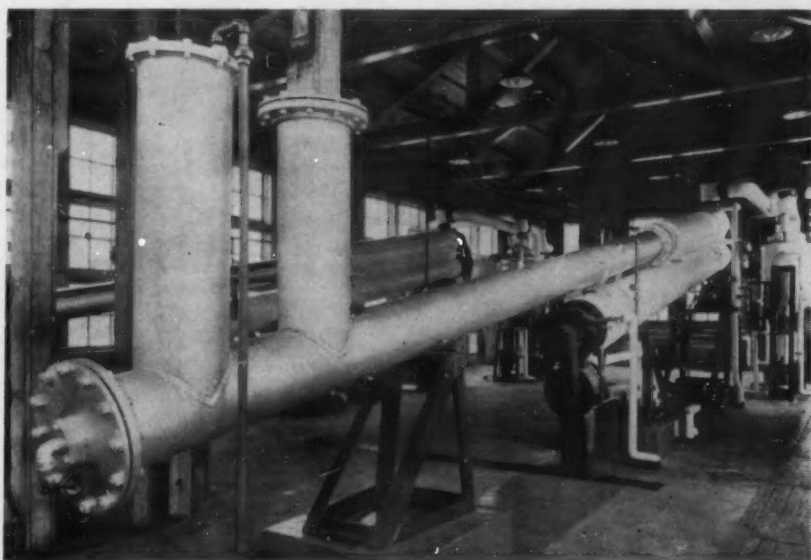


Fig. 6. Interior of one of the Ford Motor Company's soybean extraction plants (courtesy of the Ford Motor Company).



From top to bottom: 1. Soybean sprouts, always seen in the vegetable markets in the Far East. 2. Soybean curd, the "boneless meat" of millions of Oriental people, shown in a small Korean market. 3. In place of candy between meals, Japanese children often carry about a small bag of cooked vegetable soybeans, break open the pods and lick the salty beans out with their tongues. 4. Roasted soybeans are used extensively in candies in Japan and China. (Photos by courtesy of Dr. W. J. Morse, Bureau of Plant Industry.)

# Shanghaied

By W. J. MORSE  
Bureau of Plant Industry  
United States Department of  
Agriculture

IT is only within the past few years that the average citizen has evidenced much interest in the soybean as human food. Most people have thought of it primarily as a stock feed, a crop to turn under for enriching the soil, or processing for oil and oil meal. Food habits are difficult to change, as is revealed in the history of the introduction of the potato, tomato and other foods now generally used.

Prejudice, custom and ignorance of foods and food values have had much to do in hampering the more rapid utilization of the soybean as a food. During the World War, the soybean, because of its high protein and fat content, was highly recommended as a meat substitute. The varieties grown at that time were grain and forage types, difficult to cook, and possessed a rather strong, raw bean flavor. Attempts to use the beans in the home and to process them into various food products gave the soybean a rather poor rating as a dry edible bean.

The introduction of soybeans in the human diet is not experimental for ancient Chinese literature reveals that the soybean was extensively cultivated and highly valued as a food centuries before written records were kept. It has been known for many years that oriental varieties of soybeans were distinguished not only according to seed and plant characters, but also according to use for food, such as bean curd, sprouts, green vege-

SOYBEAN DIGEST



tables, roasted beans, flour and numerous other food products.

Attempts to secure seed of these food varieties from oriental countries through correspondence met with but little success, due to the fact that the edible types were classified under another name than soybean. During agricultural exploration work in the Orient from 1929 to 1931, many varieties of soybeans were found in Japan and Chosen which were used solely as green vegetables or dry edible beans. These varieties, varying in size, shape, and color of seed and ranging in maturity from 75 to 165 days, have been under test for the past 8 or 9 years at various agricultural experiment stations throughout the United States.

In addition to studies on the adaptation of these varieties to different soil and climatic conditions, extensive investigations of the cooking quality and composition of green shelled beans and dry edible beans have been made by the federal bureau of home economics and departments of home economics at nu-

Forty-two of the varieties (see table) introduced as edible beans have been found sufficiently promising to be assigned varietal names and seed stocks are being increased rapidly at various experiment stations and by several growers and seedsmen to meet the growing demand for suitable edible soybeans.

One of the most promising uses of edible varieties of soybeans is as a green shelled bean and for this purpose the pods should be picked when the beans have reached full size but are still green and succulent. The green beans resemble young, tender Lima beans and have a rich, distinctive and delicious flavor. The pods are tough and not desirable for food. The immature beans are difficult to shell but if the pods are boiled for about 3 minutes the beans shell quite readily. The beans may be cooked in any of the ways that fresh Lima beans or green garden peas are prepared. The usual oriental way of cooking green soybeans is to boil the pods in water flavored with soy sauce or salt and serve them to

## EDIBLE VARIETIES OF SOYBEANS CLASSIFIED ACCORDING TO MATURITY

### Very early (100 days or less)

Agate, Sioux

### Early (101-110 days)

Bansei, Chusei, Etum, Giant Green, Goku, Kanro, Kanum, Sac, Tastee, Waseda, Yellow Marvel

### Medium early (111-120 days)

Fuji, Hakote, Hiro, Hokkaido, Jogan, Kura, Osaya, Sato, Shiro, Sousei, Suru, Toku, Willomi, Wolverine

### Medium (121-130 days)

Chame, Emperor, Funk Delicious, Illington, Imperial

### Medium late (131-140 days)

Aoda, Easycook, Hahto, Higan, Rokusun

### Late (141 or more days)

Green and Black, Jackson, Jefferson, Nanda, Seminole

leguminous seeds. Few naturally occurring foods are as rich in protein as soybeans. Most proteins are made up of some 22 or more compounds, called amino acids, of which 9 or 10 are known to be essential for the growth and normal nutrition of animal life. Results obtained in extensive feeding tests indicate that soybeans are a fairly good source of the dietary essential amino acids.

The soybean is also a good source of important mineral elements, containing more calcium and phosphorus than any of the cereals and excelling most foods as a source of available iron. Because of the alkaline elements in soybeans, they belong to the class of alkali-forming foods. At the Hawaii Experiment Station it was found that cooked soybeans had unusually large amounts of protein, fat, calcium, phosphorus and iron as compared with most other vegetables. They also proved to be a very good source of vitamins A, B and G. Soybeans also contain varying amounts of C (immature stage and sprouts), D, E and K.

Several commercial concerns have canned large packs of the green soybeans, which have become quite popular. Preservation of green beans by quick freezing has been very successful in an experimental way, the frozen product being highly satisfactory in color, texture and flavor. The mature beans of the edible types also offer possibilities for canning in the same manner as navy

(Continued on page 10)

# ed. A Super Food



DR. W. J. MORSE

merous agricultural experiment stations and colleges. Most of these edible types have been found to be much superior to the commercial varieties in flavor, texture and ease of cooking. Moreover, tests have indicated that the flour made from edible types has a better flavor than that made from commercial varieties. Some of the edible types have also been judged to be superior to commercial types in the manufacture of bean milk, roasted beans and other food products.

In photos at right, from left to right: 1. In the Korean farmer markets one may buy the plants of green vegetable soybeans or the shelled green beans. 2. This Japanese farm girl has just pulled an armful of green vegetable soybean plants to prepare for market. 3. Korean peddler of green vegetable soybeans.

be eaten from the pod.

As a green vegetable bean, the soybean has many advantages. The green beans are available from midsummer to late fall when other green vegetables are likely to be scarce, especially in dry seasons. The soybean is not attacked by the Mexican bean beetle, which in many sections ruins crops of Lima beans and string beans.

Soybeans for table use are sown in the garden in the same manner as garden beans. Fresh green soybeans are not available before midsummer and for continued use, a succession of plantings of the same variety or of varieties of different maturity would be desirable. The period of harvest of the green beans of edible varieties may vary from 1 to 3 weeks, depending largely on weather conditions.

The unusually high percent and the character of the protein and fat in soybeans explain in part their unique nutritive value. Both the green immature and the dry beans contain much more fat and protein and less carbohydrates than other





# THE Soybean Digest



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GEO. M. STRAYER, Editor

J. W. TOWNSEND, Managing Editor

VOL. I • NO. 9

**S**OYBEANS have become the scapegoat of the grain speculators. Price fluctuations the past 2 years have been unnaturally large. A farmer who raises a crop of beans and sells them for 70 cents per bushel, only to see them shoot up to \$1.50 within a few months, is not a lover of the industry. His inclination to grow the crop may next year be suppressed by his antagonism for the system which fleeced him of half the eventual returns from his crop.

Let him hold his beans until later in the year, when prices are higher? A good theory — but not possible in many cases, especially among farm tenants. More farmers held their beans this past year than ever before — but in most cases not long enough. Perhaps that trend will continue.

Processors of soybeans will generally agree, we believe, that they would prefer a marketing system that gave them a steady flow of beans at a rather constant price. They have already spent some time in joint consideration of the problems involved, and of the adjustments which might be made.

We do not condemn grain tradings nor all speculation in grains. There are those deals which tend to stabilize prices and hold them on an even keel. We do look with disdain on those deals which cause the great price fluctuations attendant to profit-taking. They are artificial, harmful to the industry and beneficial to only a few individuals.

We need to take soybeans out of the "bad boy" classification on the grain markets. We can not do that with the type of speculation which is now prevalent.

**A**S PLANS for the annual convention of the American Soybean Association in Des Moines Sept. 12 and 13 begin to take concrete form, two features already appear to be outstanding.

First is the emphasis on the growers' side of the picture, of which a high spot will be the visit to the breeding plots at Iowa State College. If our soybean industry is to build soundly, the first step is a sound production program.

Second is the arrangement with the Hotel Fort Des Moines for exhibit booths for commercial organiza-

tions, the first time in history that other than "educational" exhibits have been permitted at an annual convention of the Association. The program committee felt that perhaps many companies would welcome an opportunity to display their work to the rest of the soybean industry. Revenue from the sale of display space will be used to better the convention.

**W**E QUOTE the following from *The Dairy Record*, published in St. Paul, Minn., for June 18, 1941:

Since oleo's friends in Congress and in the various consumer appendages to defense groups will take full advantage of the opportunity offered by the defense program, the dairy industry will have to strike boldly, and hard. It can not adopt half-way measures. It must resort to measures of which most of us have disapproved. . . .

**In short, the dairy industry must set as its goal the complete extermination of oleomargarine. It must never rest until the manufacture and sale of oleomargarine has been outlawed in this country.**

To W. A. Gordon, upon whose editorial page these remarkable statements appear, we make this challenge on behalf of the soybean growers whose oil has replaced imported oils in the manufacture of oleomargarine: We challenge you to prove that such drastic statements are the true sentiment of the industry you represent, as the "Weekly Newsmagazine of the Industry."

Mr. Gordon, millions of your fellow Americans cannot afford to buy as much butter as they need at 40 cents per pound. We cannot believe that you would deny them the right to supplement their table foods with a cheaper table spread, recognized as wholesome and nutritious by competent food authorities. We cannot believe that you would deny a market to millions of your fellow Americans for their soybean, cottonseed and peanut oils.

*If you can prove that you speak for the entire dairy industry, then fie upon the dairy industry! Such a narrow, selfish attitude is a far greater threat to our democracy than Hitler and his legions. Such a narrow, selfish attitude is the most vicious kind of fifth columnist activities our defense program faces today. Let us remember that we are Americans all. Let us live and let live.*

## THE AMERICAN SOYBEAN ASSOCIATION

President.....G. G. McIlroy, Irwin, Ohio  
Secretary-Treasurer.....J. B. Edmondson, Clayton, Indiana

Vice President.....David G. Wing, Mechanicsburg, Ohio  
Executive Secretary.....Geo. M. Strayer, Hudson, Iowa

## CBS Broadcast Planned for Convention

**R**ADIO broadcasts from stations of the Iowa Broadcasting Company and from WOI of Iowa State College may be one of the features of the American Soybean Association's annual convention, according to George M. Strayer, executive secretary. Dates of the convention are Sept. 12 and 13, at Des Moines, Iowa. Definite times for the broadcasts have not been set. There is also a possibility that the Columbia Broadcasting System's national hook-up may bring a microphone to the convention Saturday morning as a feature of "Country Journal of the Air."

Exhibit booths at the convention will be made available to anyone interested, it was decided July 11 at a program committee meeting in the Hotel Fort Des Moines. These booths will be placed in the lobby and mezzanine of the hotel. It is the first time in the history of the organization that exhibit space has been available to commercial organizations at an annual convention of the American Soybean Association.

An informal "smoker" will be held at the hotel Thursday evening, with registration beginning Friday morning. The opening feature of the program proper will be a field trip to Iowa State College at Ames, about 30 miles north of Des Moines, with discussion of growers' prob-

lems, the new grading standards, and a noon luncheon followed by an inspection trip to the hybridization and breeding plots of the United States Department of Agriculture cooperating with Iowa State College.

The program will continue Friday evening with a banquet at the Hotel Fort Des Moines. Addresses and discussions will continue Saturday at Des Moines, with a feature on "Soybeans in National Defense" occupying the radio time Saturday morning. The convention will be concluded with the business session of the Association.

Present at the program committee meeting July 11 were Martin G. Weiss, Ames, Iowa, in charge of the soybean

breeding program of the United States Department of Agriculture at Iowa State College; Graddon Swanson, Des Moines, Iowa, secretary of the Western Grain and Feed Association; Max Belz, Holland, Iowa, grain dealer; Gayle Snedecor, Rhodes, Iowa, president of the Western Grain and Feed Association; W. E. Flumerfelt, Waterloo, Iowa, of the Soy Bean Processing Company; Clarence John-dreau, agricultural secretary of the Des Moines Chamber of Commerce; O. R. Connolly of the Fort Des Moines Hotel; George M. Strayer, Hudson, Iowa, executive secretary of the American Soybean Association and editor of *The Soybean Digest*; and John W. Townsend, managing editor of *The Soybean Digest*.

## To Build Soybean Plant at Iowa Falls

Purina Mills, St. Louis, Mo., has announced plans for a new soybean processing and feed manufacturing plant to be erected at Iowa Falls, Iowa. The company has purchased a little more than 16 acres of ground at the edge of Iowa Falls, located on the Rock Island Railroad.

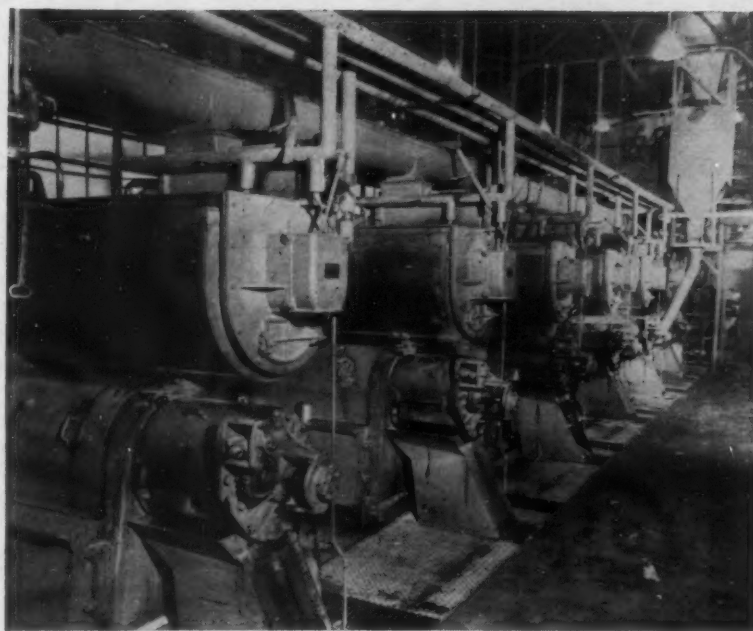
Concrete and steel storage tanks of approximately 250,000 bushels capacity will be erected, and four continuous presses with a crushing capacity of 2,800 to 3,000 bushels per day will be installed. Equipment will include a grain dump to receive beans from country elevators and farmers.

Adjoining the soybean plant a feed plant will be built to manufacture livestock and poultry feeds. The company expects to service the entire northern half of Iowa from its new plant, according to Ray E. Rowland, assistant vice president.

—sbd—

## Soybeans Set Record

With an estimated volume of trading of 600 million bushels, soybeans showed the greatest percentage increase for any commodity in the agricultural futures market during the 1941 fiscal year, according to a recent report from the United States Department of Agriculture. The 600 million figure for soybean futures was about 5 times the 1940 volume. Sharp increases in the volume of trading in fats and oils but marked declines in grains and cotton were also experienced during the past fiscal year.



## PROFITS are made in the PRESS ROOM

Wide awake processors today realize more than ever before how much their financial showing at the end of the year depends on a small per unit figure for oil extraction costs. The narrow spread between the prices of soybean products and soybeans have made it so.

That's why the largest soybean mill erected in 1940 specified French screw presses. That's why the majority of the new soybean plants built last year specified French equipment. They knew from

their own experience the fine performance obtainable with French screw presses.

Rigid, sturdy, simple design, high capacity, give less trouble, less shutdown time and greater annual production per press. And the exclusive French water cooled cage lightens oil color, minimizes foils. Be it soybeans or any other oil or fat bearing material, you will find the French Screw Press the finest machine for your extraction requirements.

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SCREW PRESSES

## THE FRENCH OIL MILL MACHINERY CO.

PIQUA, OHIO



# Soybeans . . . and People

## Hawaiians Make Many Soybean Foods

**J**APANESE residents on the islands of Hawaii have brought with them many of the foods and food habits of their Oriental homeland. Carey D. Miller, nutrition specialist at the Hawaii Agricultural Experiment Station, has described a large number of these foods in Bulletin No. 68 of the Hawaii Station, "Japanese Foods Commonly Used in Hawaii." Among these are a number of soybean preparations, of which the descriptions follow. Some American soybean enthusiasts may wish to experiment with them. If so, *The Soybean Digest* will welcome any comments on the appeal the products make to American palates.

### EDAMAME

#### (Green Soybeans)

The whole pod of the fresh green beans is placed in boiling salted water and cooked for about 25 minutes. The pods are then drained and cooled, and the beans kept in the pod until eaten. Often children eat them from a bag as they would candy.

### TOFU

#### (Soybean Curd)

Tofu is a white cheeselike product. Soybeans are soaked in water for about 8 hours and then ground with about three times their volume of water, the mass being mixed until of a uniform consistency. It is then placed in a large container and heated for 45 minutes, being gradually brought to the boiling point. After boiling for about 3 minutes, it is strained through a heavy cloth bag. The residue is known as "kirazu," and is high in calcium, phosphorus and iron, but low in vitamins. It is used to some extent in combination with vegetables, fish or dried shrimp and seasonings, but in Hawaii most of it is used as hog feed.

The liquid strained from the kirazu is soybean milk, or "tonyu," and contains 30 percent of the total protein of the crushed beans. Tofu is prepared from the soybean milk by the addition of either pure calcium chloride or a solution containing magnesium and calcium sulphates obtained in the manufacture of salt from sea water in Japan. The protein is thus precipitated in combination with calcium and magnesium salts as a flocculent curd, and is molded in a wooden frame lined with cloth, through which the liquid is drained off. The curd is subjected to pressure for about half an hour, then removed from the frame, cut in 3 to 3½ inch cubes, and placed in clear water.

The amount of the curd obtained depends on the amount of water used, the quality of the beans and the fineness of grinding, but usually runs about 350 pounds of bean curd from 100 pounds of dried beans. It contains about 9 percent



At top, "aburage" or fried soybean curd. At bottom, "kirazu" or tofu residue. Kirazu is widely used by the Japanese with fresh vegetables and cooked in shoyu or soy sauce.

of highly digestible protein, with little carbohydrate and no crude fiber. Tofu contains about one-fourth as much calcium, more than half as much phosphorus and eight times as much iron as does cows' milk.

The blocks of tofu, as ordinarily sold in Hawaii, weigh about 1 pound and retail universally for 5 cents each. At this price tofu is one-half as expensive as bread at 10 cents a pound as a source of protein, and at least one-half as expensive as cheap cuts of meat and fish as a protein source.

It may be used in the fresh state with shoyu (it cannot be kept fresh without refrigeration for more than a day), used in soup or cooked with meat, fish or vegetables in a variety of dishes. When it is to be kept without refrigeration it may be placed in boiling water and boiled for

a few minutes or it may be cut in slices about ½ inch thick and fried in fat for use in any dish desired the following day.

### ABURAGE

#### (Fried Soybean Curd)

Yellow soybeans are ground with water as in making tofu. Half the mass is cooked as described for tofu and mixed with an equal quantity of uncooked ground soybeans. The bean milk is strained off and the protein precipitated as for tofu. The product has the appearance of tofu, but after cooking becomes light in texture, whereas tofu does not. The curd is cut in triangles and fried a light brown, usually in rapeseed oil.

Aburage is made at tofu-manufacturing shops, and as commonly prepared will keep without refrigeration for 2 days. Aburage is often cut to form a small cornucopia and cooked for about 15



minutes in a mixture of shoyu, sugar and dried shrimp to impart flavor to the aburage. The cornucopia is filled with a mixture of rice, seasoned with salt and vinegar, and vegetables and fish.

When it is cooked in oil the curd loses water and absorbs the oil, and the resulting food contains more than 20 percent of protein and fat. Only 34 grams, or one and a half triangles, are necessary to yield 100 calories. The product is somewhat like the white of an egg which has been browned in deep fat. The vitamin content is probably negligible, but analyses made in Japan indicate a high calcium, phosphorus and iron content.

#### MISO

##### (Fermented Rice and Soybeans)

Miso, a favorite food of the Japanese, is made from koji (fermented rice) and soybeans. A long process of fermentation is required, of which more complete details will be supplied upon request.

Miso may be used alone or in a variety of dishes. It is widely used in the pickling of such vegetables as eggplant, cucumbers, daikon and the Oriental pickling melon. Most of the Japanese families in Hawaii who continue to eat Japanese foods use miso every day, usually in the form of soup for breakfast. As a result of grinding and mixing and of the enzymic action on the carbohydrates and protein, part of the miso is soluble in water. Most of the rest readily forms a suspension so that when it is ground, mixed with water and passed through a sieve, the residue con-

sists only of a few coarse particles. Miso has a high energy value, but is not as good a source of calcium, phosphorus and iron as are soybeans, because koji made from polished rice constitutes half the mixture. It is a better source of iron than are many green vegetables.

#### SHOYU

Shoyu or soy sauce is a clear, brown liquid used as an essential condiment in Japanese cookery, and to a considerable extent in the United States. It has a pleasant, aromatic odor and a peculiar taste. Shoyu contains considerable salt and dishes in which it is used require no additional seasoning.

The soybeans are washed and cooked, without being soaked, for about 8 hours, drained, cooled and added to wheat or barley that has been roasted and coarsely ground. To this mixture is added what the Hawaiian manufacturers call "shoyu yeast," which probably consists essentially of spores of *Aspergillus oryzae*. The mass is then placed on small trays and left in a warm room for 2 days to promote growth of the fungus, the enzymes of which act on the carbohydrates and the protein.

The mass is then transferred to large vats, mixed with salted water and allowed to stand for 6 months or longer, being stirred daily. Usually it is thought that the longer the period of fermentation the finer the quality of the shoyu, Japanese manufacturers sometimes allowing it to ferment for as long as 5 years.

When the fermentation process is completed the mixture is taken from the vats and placed in bags, and the liquid is expressed under pressure. The liquid constituting the shoyu is boiled enough to sterilize it and then put in barrels or in bottles for the market.

—sbd—

## Arcola Homecoming Draws Many Exhibits

A huge soybean exhibit will be one of the featured attractions at the Arcola (Illinois) Homecoming July 31, Aug. 1 and 2, according to Tom Monahan, Jr., general chairman, who reports that a large number of prominent firms in the soybean industry will send exhibits for the soybean section. The American Soybean Association will also have an exhibit at the celebration, and the University of Illinois is preparing an educational exhibit under the direction of Prof. W. L. Burlison.

The list of firms to send exhibits include railroads, processing companies, soya food companies, farm machinery companies, processing machinery manufacturers, industrial utilizers of soybean products and plastics manufacturers. It is expected to be one of the most complete soybean exhibits ever assembled.

According to present plans the exhibit will be moved to the Moultrie-Douglas County Fair at Arthur, Ill., Aug. 5 to 9, a fair boasting a \$15,000 budget, at the close of the Arcola Homecoming.

# Wanted . . . MILLIONS OF POUNDS OF SOYBEAN OIL

● In the light of expanding Soybean production and curtailed foreign markets, sales of Soybean Oil to Margarine manufacturers must be substantially increased. Today manufacturers of Margarine should be using many millions of pounds of Soybean Oil per year in addition to the 82,333,941 pounds used during the Federal Fiscal year ending June 30th, 1940.

Consumers all over America want to buy Margarine made from Soybean Oil, but in many States they seldom get the chance. Discriminatory State and Federal Taxes hinder the sale of this Soybean Oil product. They deny American farm producers a legitimate market for their oils and fats and milk. These taxes are unfair to the growers of Soybean, corn and peanut oils and animal fats. They should be repealed. For years the Institute of Margarine Manufacturers fought to have them repealed. Now — with your help — the fight can be won.

Get in touch with your State — your Federal Legislators. Write to them. Urge them to get behind this campaign for repeal of these unfair, un-American Tax Laws.

## NATIONAL MARGARINE INSTITUTE

OLD COLONY BUILDING • CHICAGO, ILLINOIS

## Record Seed Harvest Forecast for Soybeans

Official federal crop estimates as of July 1 placed 1941 soybean acreage in the United States at 9,990,000 acres grown alone for all purposes, a decline of 5 percent from 1940's all time record of 10,528,000 acres. It is 5 percent above 1939's acreage of 9,506,000.

Earlier private estimates placed the acreage to be harvested for beans at approximately 5,200,000 acres which compares with 4,961,000 acres last year. Government economists believed acreage harvested for beans might be as high as 5,400,000, a new record. With a yield equal to the average of the last 5 years, this would mean a production of 95 to 100 million bushels.

In spite of the decline in acreage, pros-

pects appear excellent for a crop at least as large as 1939's record production, and possibly larger. Acreage through the corn belt as a whole is slightly larger than in 1939, and crop prospects are the best since 1939. Illinois reports an increased percentage seeded in rows. Although a record acreage was seeded in 1940, severe drouths cut the yield with the result that total production was less than in 1939.

AAA revisions which permit the harvesting of soybeans for seed which were originally sown for hay without penalty in AAA payments, as well as the current high prices of soybeans, may well encourage the harvesting of a record number of soybean fields for seed. Soybean acreages in the six leading states, with 1940, 1939 and 1929-38 averages, are given in the table below:

	1941	1940	1939	1929-38 Average
— (Thousands of acres) —				
Illinois	2,912	3,065	2,931	1,394
Iowa	1,434	1,559	1,343	510
Indiana	1,357	1,508	1,423	629
Ohio	902	1,037	864	241
Missouri	480	480	390	408
N. Carolina	331	321	306	228

—abd—

## Shanghaied — A Super Food

(Continued from page 5)

beans and red kidney beans. Some of the edible varieties have been found to be better suited to the making of special products, such as bean milk, bean curd, bean flour and roasted beans than others, and as larger supplies of these varieties become available, undoubtedly such uses will be greatly extended.

The introduction of edible types of soybeans suitable for using in the green or dry stages and possessing qualities for table use superior to the ordinary commercial types, will undoubtedly do much to overcome earlier prejudices and will probably result in more extensive use of the soybean as a food by the American public in the future.

Literature on the nutritional value of edible varieties of soybeans and ways of using them as food have been issued under the following titles:

1. The nutritive value of green immature soybeans. *Journal Agricultural Research*. V. 49. No. 2. July 15, 1934.
2. Soybean dishes — new and old. *College of Agriculture, University of Wisconsin. Special Circular* (Revised February, 1937).
3. Soybeans for the table. U. S. Department of Agriculture. Leaflet No. 166. 1938.
4. A study of soybean varieties with reference to their use as food. *University of Illinois Agricultural Experiment Station. Bul. 443*. 1938.
5. Eighteen varieties of edible soybeans. *University of Illinois Agricultural Experiment Station. Bul. 453*. 1939.
6. Soybean culture and varieties. U. S. Department of Agriculture. *Farmers' Bul. 1520*. (Revised 1939).
7. Range of adaptation of certain varieties of vegetable-type soybeans. *University of Illinois Agricultural Experiment Station. Bul. 471*. 1940.
8. Pea and edible soybean variety and strain trials. 1940. *Pennsylvania State College of Agriculture and Experiment Station. Paper No. 1002 in the Journal Series*, 1940.
9. Edible soybeans. *Purdue University Agricultural Experiment Station, Division of Agronomy, Project 8. Form 5*, 1941.
10. Ways of using soybeans as food. *Department of Home Economics, University of Illinois (mimeographed)*.

## • Careful Selection of Raw Materials

Soybeans for processing in Kellogg plants are carefully inspected and bought only when meeting the highest standards of quality.

This quality is maintained in carrying out the plant processes. The Kellogg control laboratory and trained chemists at each plant make certain that Kellogg Meals, both Soybean and Linseed, are uniformly excellent.



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**"Keep Ahead With Kellogg"**



# Pacific Coast Mills First to Crush Soybeans in United States in 1910

(First in a series contributed by Soybean Nutritional Research Council)

By LAMAR KISHLAR  
Member, Soybean Nutritional  
Research Council

Much has been written of the spectacular development of the soybean industry in the United States, but little has been said of the pioneers who brought this oriental plant to America and applied it to American uses.

The first written record of the soybean is contained in a "Materia Medica"

written by Emperor Shen-nung in 2838 B. C., which describes many plants of China. Even the name is cloaked with antiquity. In early Chinese history the name "Shi-yu" and also the name "Ta-tou" were applied to the soybean. These names probably antedate the first written records of the soybean.

In 1804 James Mease, a Pennsylvanian, first mentioned in American literature that the soybean was adapted to Pennsylvania and should be cultivated. In 1829 a brown seeded variety was grown in the Botanic Garden at Cambridge, Mass., as a botanical curiosity. In 1854 the Admiral Perry Expedition brought back two varieties of soybeans from Japan.

As early as 1910, imported Manchurian soybeans were first crushed by an oil mill on the Pacific coast.

Soybean oil hardened by hydrogenation was used in shortenings as early as 1914. In 1915 the first production of soybean oil from domestic seed was at Elizabeth City, N. C., in a cottonseed oil mill using Anderson Expellers.

Soybean oil in margarine was first used in large quantities in 1916, although it had been used in a small way as early as 1912. Soybean oil was also used in considerable quantities in a blended salad oil. In 1918, 336 million pounds of this oil were imported from the Orient.

In 1920 an Expeller was first used in processing soybean oil and meal from domestic seed at Chicago Heights, Ill. In 1922 large scale production of soybean oil and meal was under way at Decatur, Ill., using Expellers.

The following year the first solvent extraction plant for use on soybeans was built at Monticello, Ill. It was 1929,

## Included in Stamp Plan

In addition to nationally designated foods for all Stamp Plan areas, vegetable shortening continued available during July in a number of Stamp Plan areas in Texas, Tennessee and Louisiana, according to a release by the United States Department of Agriculture.

Vegetable shortening represents the largest outlet for soybean oil, 212,317,000 pounds having gone into shortening in 1940. Vegetable shortenings have been offered for sale under the Stamp Plan in only a few scattered areas, however, in spite of the fact that domestic oils are used in its manufacture.

Current high prices for soybeans have moved nearly the entire crop from farms, figures from the Illinois Crop Reporting Service indicate. Soybean stocks on Illinois farms as of July 1 were 351,000 bushels, compared with 2,341,000 bushels at the same time last year.

however, before commercial production was started in the Monticello plant due to the fact that beans were not available at a price which was satisfactory.

By 1936 the soybean processing industry had grown to such proportions that the United States Government established the "United States Regional Soybean Industrial Products Laboratory" at the University of Illinois in cooperation with twelve North Central states.

In the Chicago Board of Trade, trading in soybeans is second only to wheat in volume. From small beginnings this industry has grown until the production of soybean oil and meal in the United States is only exceeded by Manchuria, the native home of this little bean.

## Soybean Production Improved 57.5%



### with ROCK PHOSPHATE

Sam Ackerman of Taxewell Co., Illinois (shown above in the midst of his Soybean crop) made this test with 1000 pounds of Rock Phosphate per acre. After applying the phosphate to one section, the entire field was drilled to soybeans. Production on the phosphated portion of the field was 57.5% more (weight of the whole plant) than on the part not phosphated. That's not all! There were 62% more soybeans in the pods of the plants from the phosphated land! This is typical of the results obtained from applying . . .

## RUHM'S PHOSPHATE

This high-grade, finely ground, natural rock phosphate offers the most effective means of supplying the phosphorous which soybeans must have, to replace the great quantities of this vital element removed from the soil with each crop. It is the cheapest and the longest-lasting source of phosphorous. If you want to get bigger, better quality, earlier-maturing soybean crops write for full details and prices.

### "FARMER" RUSK

Bloomington, Illinois

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Mt. Pleasant, Tennessee

## ON DISPLAY!

### Convention Offers Exhibit Space To YOU!

For the first time in the history of the American Soybean Association, opportunity will be given for display of commercial products of soybeans and related industries at the annual convention, this year being held in Des Moines, Sept. 12-13.

Plans are now being made to accommodate exhibit booths in the lobby and on the mezzanine floor of Hotel Fort Des Moines, headquarters of the convention.

No matter what your interest in the soybean industry, this is the logical time to present your soybean products to growers, processors and leaders from all branches of the industry.

**BOOTH RATE \$35**

FOR INFORMATION AND RESERVATIONS **Write**

**Geo. M. Strayer**  
HUDSON, IOWA

Executive Secretary

AMERICAN SOYBEAN ASSOCIATION



## Iowa Milling Company Builds New Elevators

Newly constructed elevators and storage bins have brought the storage capacity of the Iowa Milling Company at Cedar Rapids, Iowa, to 300,000 bushels of soybeans, and all of this capacity is in use, Manager Joe Sinaiko reports.

The new bins are declared to be the tallest in Iowa, stretching 155 feet into the sky. This enlarged capacity brings Cedar Rapids into the position of one of the Mid-west's major soybean processing centers.

The Iowa Milling Company processes more than a million bushels of soybeans annually, and is the producer of "Vitamo" livestock feeds.

—sbd—

## Castor Bean Seed Grown for Emergency

An emergency castor-bean seed production program was announced June 10 by the Agricultural Adjustment Administration. The program is designed to furnish a supply of adapted seed stocks in the event defense developments make it expedient to increase domestic castor bean production in 1942. The program will be limited to 11 counties in the black-land area north and south of Dallas, Tex.

It is planned to produce enough seed to plant from 250,000 to 300,000 acres in the event it becomes necessary to do so.

Plantings of 250,000 acres would produce from 55 million to 80 million pounds of oil depending on seasonal conditions.

During the first World War an attempt was made to grow castor beans domestically, but it failed because of the lack of adapted seed. Dehydrated castor oil can be used as a substitute for tung oil in some important uses, and the seed production program is stressed as a defense measure because of the possible shortage of shipping space to bring tung oil from China and castor beans from Brazil and India. Under normal conditions, castor beans usually cannot be grown successfully in this country in competition with beans produced in semi-tropical areas.

—sbd—

## Cotton Acreage Declines in South

United States cotton acreage is estimated at 23,519,000 acres as of July 1, compared with 24,871,000 acres in 1940. The estimated oil production from this acreage is from 3,100,000 to 3,200,000 barrels of refined oil, compared to a production of 3,345,000 barrels estimated for the 1940-41 crushing season.

Flax production estimates for 1941 place this year's crop at 30,018,000 bushels compared with 31,217,000 bushels in 1940. Flax acreage tripled in Illinois this year, 18,000 acres as compared to 6,000 in 1940. The yield prospect is about 11 bushels per acre compared to 15 in 1940.

## Market Street

We invite the readers of *The Soybean Digest* to use "MARKET STREET" for their classified advertising. If you have processing machinery, laboratory equipment, soybean seed, or other items of interest to the industry, advertise them here.

Rate: 50 per word per issue.  
Minimum insertion \$1.00.

WANTED — Journalist with interest in soybeans to replace man being called for military service. Write Box E, *The Soybean Digest*, Hudson, Iowa.

American Tung Oil Association members were urged by their president, J. B. Wright, speaking at the annual meeting of the association April 25 and 26 in Gulfport, Miss., to plant additional acres to tung trees and to induce others to plant more tung trees in the interests of "national defense." A normal domestic tung nut crop is anticipated next fall.

—sbd—

A special ration developed by U. S. Army experts for the army's pilots consists of a cracker made of whole wheat, soybean meal, ground beef muscle, whole milk, hydrogenated fat (possibly soybean oil), vitamins and minerals, report Drew Pearson and Robert S. Allen in their column "Washington Merry-Go-Round." The cracker is said to withstand tropical heat without spoiling.

## If You Are a Soybean Grower and

## If You Have Poultry or Livestock...

Then you should be feeding Purina Chows. These feeds are supplements to your grain and they are made to do a more profitable job of producing pork, eggs, or milk than straight grain will do. And they use soybean meal as a major source of protein. In fact, Purina Mills is the largest user of soybean oilmeal in the country. Use the feeds that utilize the beans you grow! . . . Purina Mills, St. Louis, Mo.



## WE ARE NOT MAGICIANS . . .

**BUT** — we have done “wonders” with the Soybean. The Glidden Company’s main purpose in this industry is to develop as many different products from the soybean as is commercially possible. If your industry is among the following, we have a product for you:

**Feeds**

**Fertilizer**

**Shortening**

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**Canned Foods**

**Margarine**

**Salad Oil**

**Sausage**

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**Adhesives**

**Core Oil**

**Lacquers**

**Paper Manufacturing**

**Pharmaceuticals**

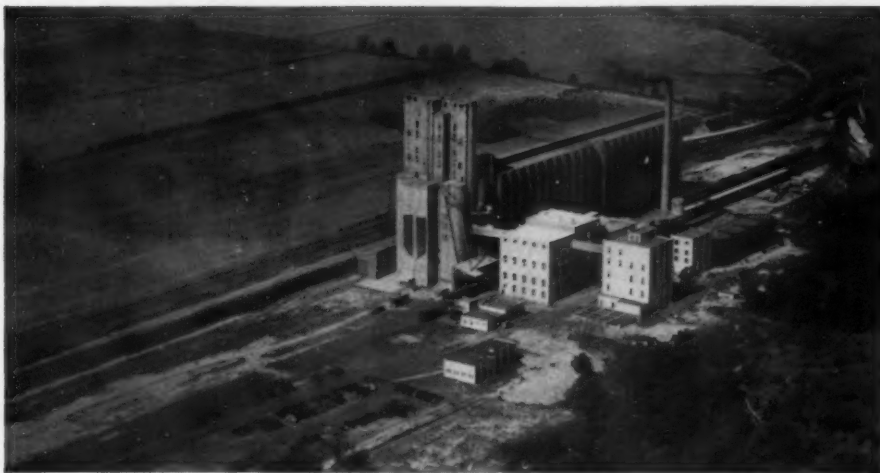
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### WHAT IS GOOD-WILL?

Good-Will is the disposition of a satisfied customer to return to the place where he has been well treated.

The Archer and Daniels families have been engaged in the Oil Milling business for a century (1840-1940), and the good-will which has been built up during those hundred years is jealously guarded in every transaction.

**ARCHER-DANIELS-MIDLAND COMPANY**  
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*Quality Soybean Products*



# TAILOR-MAKE SOYBEAN MEAL WITH SKELLYSOLVE

*... and get more  
oil per bushel*

THE Soybean processing industry is turning to solvents. Soybean oil is bringing higher prices. That makes it more imperative *and more profitable* to get the extra pounds of oil which can be taken from each bushel by the solvent method. Furthermore, new processes enable the solvent processor to tailor-make his meal for *any* desired use—feeding or industrial.

Anticipating the growing interest in the solvent processing of soybeans, the Skelly Oil Company is in a position to supply soybean processors a type of SKELLYSOLVE especially refined to provide efficient and economical extraction of soybean oil.

SKELLYSOLVE'S reputation as one of America's foremost suppliers of solvents is built on three things:

**First**—the right type of solvent for YOUR particular requirement.

**Second**—getting that type of solvent to you when you need it and when emergency arises.

**Third**—special technical assistance in the solution of special problems.

Write or wire today to the address below, for complete information. There is no obligation, of course.

## SKELLYSOLVE for the SOYBEAN Industry

There are six different types of Skellysolve which are especially adapted to the efficient extraction of corn germ, soybean, cottonseed, meat scrap, and other vegetable and animal oils. The Skellysolve that is especially refined for extraction of more oil from each bushel of soybeans has the correct boiling range and other special properties which meet the exacting requirements of this particular service.



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